constitution. This was sufficient to attract attention to the technique of cell fractionation. In the next chapter, I will discuss these and other results in detail and explore how they contributed to the body of knowledge that came to characterize cell biology. It is important to note that already the first criterion for adequacy of a new technique was satisfied – the technique was generating a determinate and replicable pattern of results.

Yet, the developers of techniques for cell fractionation, and especially their critics, were very concerned about whether centrifugation procedures created artifacts. As I noted, the most commonly cited criterion in evaluating results from a new technique is correspondence with evidence from other procedures. In the case of cell fractionation researchers sought to relate the results to those obtained in microscopy by comparing the appearance of the fractionation products with the appearance of organelles in whole cells. Early fractionation studies failed this test – the isolated, centrifuged organelles did not look at all like they did under the light microscope. This was particularly true of mitochondria. Hogeboom, Schneider, & Palade (1948) explored alternative media in large part to try to make isolated mitochondria retain their typical elongated shape and to stain with Janus Green B, a traditional mitochondrial stain. Thus, the initial failures did not lead researchers to abandon the technique but to revise it so that it yielded evidence comparable to older techniques. This is what I referred to previously as seeking consilience of results in order to calibrate the new technique.

What exactly was the *technique* of cell fractionation? For Latour, a technique could be characterized as a black box when the steps involved are taken for granted as part of established practice. Cell fractionation had achieved this status by the late 1950s and 1960s, and recipes for performing it were widely available in manuals of experimental procedure. While the techniques retained a close resemblance to those initially developed by Bensley and Hoerr and by Claude, they also incorporated some substantive changes that put their mark on the results obtained. These changes were evident both in the methods for preparing cell materials and in the centrifugation regimes employed to fractionate them.

There were two major approaches to preparing materials for fractionation. (Details varied, depending on the material selected – such as bacteria, algae, or liver tissue – and which cell constituents were of interest.) In the aqueous approach, the material was put in an aqueous medium (e.g., 0.88 *M* sucrose solution when mitochondria were targeted) and shearing forces were used to break the cell membranes. The resulting material is called a *homogenate* (because the cells have been broken and their contents blended)